TECHNICAL NOTES

LAKE STATES FOREST EXPERIMENT STATION
U.S. DEPARTMENT OF AGRICULTURE · · FOREST SERVICE

No. 487

Tamarack Mortality Due to Larch Sawfly Defoliation Increases in Minnesota

The larch sawfly (Pristiphora erichsonii (Htg.)) has been in epidemic status in northern Minnesota since 1948. Partial to complete defoliation of tamarack (Larix laricina (Du Roi) K. Koch) has occurred in nearly all of the northern Minnesota stands because of infestation by this insect. The degree of defoliation in any one stand fluctuates from year to year. Following heavy defoliation the trees often refoliate.

It has been estimated that during the major outbreak from 1910 to 1926 approximately 75 percent of the tamarack was killed. However, records were lacking concerning the number of years stands could tolerate heavy defoliation before tree mortality occurred. To obtain this information during the present outbreak, permanent observation points were established in 1951 and 1952 in widely scattered stands throughout the infested area. The amount of defoliation on 10 trees within each stand was estimated annually and averaged to represent defoliation of the entire stand. In addition, all trees on a tenth-acre plot at each observation point were examined annually to study the advance of decadence.

The first tamarack mortality resulting from sawfly defoliation was noticed on the Two Harbors and Aurora Ranger Districts of the Superior National Forest in the fall of 1954, 7 years after defoliation became noticeable. Tree death occurred in areas having thin duff over mineral soil and rock outcrops. A survey was conducted on these poor sites and the results published in the Journal of Forestry.1/

In 1956 mortality was reported near Laporte, Minn. This stand is on a good tamarack site adjacent to the extensive bogs of north central Minnesota. Temporary tenth-acre circular plots were established at or near the permanent observation points to determine the extent of mortality.2/ All tamaracks within the plots were recorded by 2-inch diameter classes as living or dead. These data were grouped for each observation point to obtain the total percent mortality. The percentage of mortality ranged from 0 to 22. The highest percentage was in a stand bordering the poor tamarack sites. Much of this mortality occurred in the 2-inch diameter class, and probably part of it could be attributed to natural tree competition. However, most of these trees were in a codominant position and had ample growing space. The associated tree species, black spruce (Picea mariana (Mill.) B.S.P.) and

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1/ Beckwith, L. C., and Drooz, A. T. 1956. Tamarack mortality in Minnesota due to larch sawfly outbreak. Jour. Forestry 54: 268-269.

2/ Field assistance on this survey by Hart Graeber of the Office of the State Entomologist of Minnesota is greatly appreciated.

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northern white-cedar (Thuja occidentalis L.) had not been killed, eliminating the possibility of tamarack death by other causes such as high water. Turnock[3/] observed similar conditions in Canada.

From 20 to 100 percent defoliation occurred annually during 1952 to 1955 at the observation points within the survey area. The trees at all of these points suffered at least 85 percent defoliation in 1956. Secondary bark beetles were present in some of the dead trees, but many lacked evidence of attack.

Since tamarack is the only species that will grow to merchantable size in many of the areas with the wet, cool conditions common to the bogs of northern Minnesota, the importance of tree mortality due to the sawfly is obvious. It will assume even more importance as the trees become larger and increase in value. Previous to the last sawfly outbreak a peak tamarack lumber production of 157,192,000 board-feet was reached in 1909.[4/] Most of this volume was taken from the Lake States. In addition, the species was used for crossties, pulpwood, mine timbers, poles, and fuelwood. If the present stands survive the current outbreak, utilization will again increase because the trees are approaching commercial size.

From the mortality data now available, it appears that tamarack trees will survive up to 7 to 8 years of repeated heavy defoliation before they succumb. The exact length of time depends upon various factors such as intensity of defoliation, vigor of the trees, and site conditions.

April 1957

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3/ Personal communication from W. J. Turnock, Forest Biology Laboratory, Winnipeg, Manitoba, Canada.

4/ Betts, H. S. 1945. Tamarack, American Woods. U. S. Forest Service, 5 pp., illus.